

Community-Initiated Urban Development: An Ecological Intervention

Jan C. Semenza, Tanya L. March, and Brian D. Bontempo

ABSTRACT *Neglected urban environments have been linked to social isolation, depression, and other health problems. In Portland, OR in 2003, an intervention was implemented and evaluated in three neighborhoods with the objective of promoting community participation in urban renewal and engaging residents in the construction of attractive urban places. Municipal officials approved and permitted community-designed street murals, public benches, planter boxes, information kiosks with bulletin boards, trellises for hanging gardens, all positioned in the public right-of-way. Residents within a two-block radius of the three sites were systematically sampled and interviewed before (N = 325) and after (N = 349) the intervention, of which, 265 individuals completed both surveys of the panel study. After the intervention, multivariate results revealed improvements in mental health ($p = 0.03$), increased sense of community ($p < 0.01$), and an overall expansion of social capital ($p = 0.04$). Through community empowerment, participation, and collective action, the strategy successfully engaged residents in restoring neighborhoods, with direct benefits to community well-being.*

KEYWORDS *Community development, Health promotion, Neighborhood, Social capital, Social networks, Urban environment.*

INTRODUCTION

Both individual and ecological factors are determinants of health.¹ While modifying personal risk factors can be challenging,² transforming the environment to advance public health seems even more daunting.³ Public health professionals, policy-makers, and urban planners are increasingly concerned about neighborhood environments as determinants of health outcomes, including obesity, diabetes, asthma, and depression.⁴ While chronic diseases are clearly multi-factorial, enhancing cities so that they promote a healthier lifestyle that includes walking and socializing may nonetheless be feasible.

Attractive pedestrian destinations in public places can encourage active lifestyles, independent of the car. However, many American cities tend to be arranged according to the orthogonal grid that eases traffic flow but often lacks public gathering places where urbanites can stroll and socialize.⁵ The rectangular street network is ideal for the effective movement of people and goods, since it

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increases connectivity between any two points and provides multiple transportation routes, but the omission of public squares, plazas, parks, or gardens can result in a loss of community and sense of place.⁶ The endless grid, devoid of useable public places and civic amenities, stifles community life. Rich, spontaneous social networks fall victim to the steady stream of traffic, and with them, the collective resource called social capital. Social capital refers to the potential inherent in social networks, and is composed of bonding, bridging, and linking social capital.⁷⁻⁹ Bonding social capital, which relies on personal ties to existing social or religious groups, is necessary for community problem-solving, but alone is not sufficient, because it may produce redundant information not pertinent to the improvement of inner-city neighborhoods.¹⁰ In contrast, bridging social capital connects dissimilar groups and can reveal new information for problem-solving by drawing on the expertise of professionals, such as architects, engineers, or builders. An extension of bridging social capital is linking social capital, which connects parties unequal in power and access, such as between community groups and government agencies.¹¹ Bridging and linking social capital are found predominantly in neighborhoods with higher incomes, which explains in part the greater success of improvements in such communities. Conversely, community development in lower income neighborhoods tends to be slower and less successful, in part due to lower stores of bridging/linking social capital among lower-income residents.¹²

The purpose of this study was to improve social capital and community well-being through the restoration of public squares.¹³ Implementation followed a structured process. First, design workshops established or reinforced bonding social capital and problem-solving capacity among the low- to moderate-income residents.^{14,15} Next, municipal approval and permitting augmented bridging/linking social capital, and finally, construction empowered residents through communal action.¹⁶ A pre/post survey of residents at three sites in Portland, OR evaluated the ecological intervention. The community development approach was based on participation, empowerment, and collective action, which are at the core of health promotion practice.¹⁷ Improving the neighborhood physically (streets and public squares), socially (social networks and cohesion), and symbolically (sense of belonging and pride) required a high level of neighborhood involvement, which has been linked to well-being and health.¹⁸

METHODS

Community Development

The strategy began with a situation analysis and extensive outreach to community members and other stakeholders as part of asset mapping.^{17,19} The method aimed to bring neighborhood residents together during social activities (potlucks or block parties), promote discussions, and work collectively to strengthen bonding social capital (Figure 1). Subsequently, project organizers, architects, and natural builders assisted neighborhood groups with developing designs for their projects through design workshops, and communicating with various organizations and professionals outside the neighborhood to augment bridging capital.

The City Repair Project, a non-profit organization located in Portland, OR dedicated to community-building, devised a procedure for constructively engaging citizens, municipal officials, neighborhood associations, and builders in the creation of community-designed, environmentally beneficial gathering places (Figure 1). An

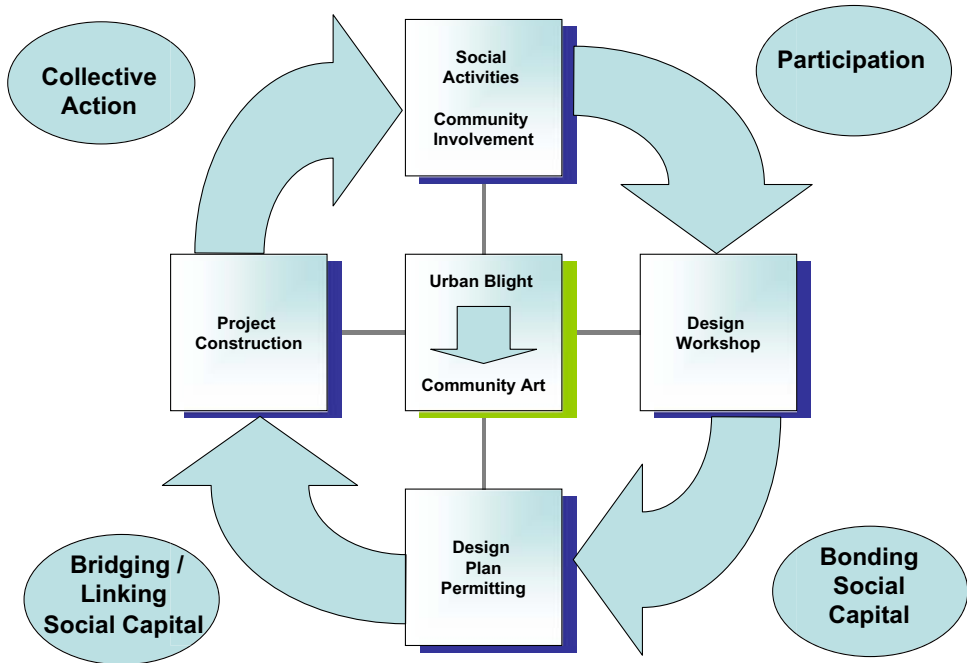


FIGURE 1. Social capital sustainability cycle for health promotion and urban community development, Portland, OR, 2003.

organizing committee, composed of City Repair staff, was charged with outreach to and involvement of low- and moderate-income neighborhoods. From a line-listing of candidate sites, three communities were selected in January 2003, according to the principles of community-based participatory research that support successful partnerships.²⁰ Selection criteria specified that each site be a low- to moderate-income neighborhood, have a core group of committed residents, possess its own strengths and resources, collaborate equitably with all partners in all phases of the research, employ a cyclical and iterative process, and empower all partners for their mutual benefit. Sites that did not meet the criteria were encouraged to strengthen their community involvement and reapply the following year. They were not evaluated as part of this research project.

In February 2003, trained facilitators and design professionals organized workshops wherein each site developed its own design. In collaboration with municipal officials, structural engineers, and architects, members of the sites finalized their plans according to municipal building codes. Plans were submitted to the Portland Department of Transportation and Bureau of Planning for approval and permitting (Figure 1). In order to support the communities with sufficient expertise in ecological and sustainable building techniques, experienced coordinators and team leaders were assigned to the sites. The Village Building Convergence, a far-reaching workshop, was held May 9th–18th, 2003, during which national and international ecological builders directed over 1,000 residents and out-of town volunteers in hands-on construction of a variety of structures. While the neighborhoods all met the inclusion criteria, they differed in certain demographic characteristics (Table 1). Median household income ranged from \$28,960 to

TABLE 1. Demographic composition of neighborhoods with health-promoting neighborhood interventions, Portland, OR, 2003

	Site 1	Site 2	Site 3
Urban design features implemented by community	Street mural: sunflower, cob information kiosk, stained glass mosaic art wall with solar-powered fountain, three trellises and one dome, eight planters in street	Street mural: labyrinth, cob information kiosk, cob bench, permaculture activities	Two cob bench/planters on intersection park, eight planter boxes with cob siding to narrow street, lawn chess board, labyrinth, sauna
Population	7,155	7,923	11,320
Area (in acres)	383	739	814
Population density persons per acre	18	10	13
Male population	3,320 (46%)	4,137 (52%)	5,468 (48%)
Female population	3,835 (54%)	3,786 (48%)	5,852 (52%)
Households	3,487	4,312	4,972
Home owners	1,230 (35%)	710 (16%)	2,990 (60%)
Renters	2,257 (65%)	3,602 (84%)	1,982 (40%)
Household size	2.05 avg	1.84 avg	2.28 avg
Race/ethnic groups			
White	86.1%	81.1%	81.7%
Black	1.7%	4.1%	1.4%
Native American or native islander	1.2%	1.7%	0.9%
Asian	4.4%	2.6%	7.1%
Other	1.2%	2.7%	2.0%
Hispanic	3.4%	5.4%	4.1%

Age distribution				
under 5	3.7%	2.9%	4.9%	
5–17	7.2%	7.2%	11.6%	
18–21	4.1%	4.5%	3.6%	
22–39	48.8%	52.0%	40.6%	
40–64	24.6%	28.4%	28.8%	
65 and over	11.7%	4.9%	10.4	
Educational attainment ^a				
High school graduate or higher	89.0%	90.8%	84.4%	
Bachelor's degree or higher	38.0%	46.5%	31.7%	
Median household income ^a	\$37,181	\$28,960	\$39,984	
Employment status ^a				
In labor force	64.0%	82.3%	67.7	
Employed	57.2%	77.6%	63.4	
Unemployed	6.8%	4.7%	4.4	
Not in labor force	36.0%	17.7%	32.3	
Families below poverty level ^a	6.8%	17.1	9.6	
Families with female householder (no husband present) below poverty level ^a	17.6%	35.6	31.3	
Individuals below poverty level ^a	13.1%	18.5	11.9	

^aSource: U.S. Census Bureau; 2000 Census Tract Summary Files (<http://factfinder.census.gov>): Summary File 3 collected from a 1-in-6 sample and weighted to represent the total population; and PortlandMaps © 2005, City of Portland

\$39,984, and home ownership ranged from 16 to 60%, according to U.S. Census data (2000).

MEASURES

For the pre/post evaluation, community members proposed topics for a survey instrument derived from validated instruments pertaining to depression²¹ (CESD-11), well-being²² (SF-36), social capital,²³ and community capacity.¹⁴ The instrument contained the 11 CESD items and 19 rating-scale items pertaining to social capital that were divided into four sections: sense of community, social interaction, perceived control, and neighborhood participation. Respondents answered validated questions using multiple-point rating scales, and also provided demographic information, general health information, and their level of participation in the intervention.

DATA COLLECTION

The survey was administered as part of a prospective longitudinal study of residents before and after the intervention. The sampling frame was defined by a comprehensive line-listing of all residences within a two-block radius of each site. The sampling frame was chosen because city ordinance requires residents within these areas to approve designs before construction. Portland State University undergraduate students, trained in interviewing techniques, systematically sampled all residences by going door-to-door. At least four attempts were made to enroll one adult (over 21 years of age) head of household (self-report) for each household. Data collection for the first round (time 1) began on April 16th and was completed before the start of the workshop (May 9th). The follow-up survey began on May 19th, immediately after the end of the workshop, and was completed in July (time 2).

ANALYSIS

Although each question and its respective sub-section probed a distinct aspect of social capital, the content of each section showed a great deal of conceptual commonality. Despite this commonality, there were not enough questions on the survey to build a reliable scale ($\alpha=0.82$ for social capital and 0.62 for depression). Therefore, MANOVAs were used to analyze the pre/post data.

RESULTS

At Site 1, community organizing and public engagement resulted in the painting of a large street mural and the construction of several interactive art structures. The community raised three wooden trellises and a large metal dome sculpture at each corner of the intersection and installed planters on the street corners (Table 1 and Figure 2). At the other two sites, participants created unique ecological constructions, including a cob kiosk, cob benches, a street mural, a lawn chessboard, a light clay sauna, and a walking labyrinth.

At Site 1, the sampling frame comprised 131 households, of which, 106 (81%) were invited to participate and 49 (37%) were vacant or not reached. In 12 households (9%), both heads of household declined to participate. Of 295 eligible

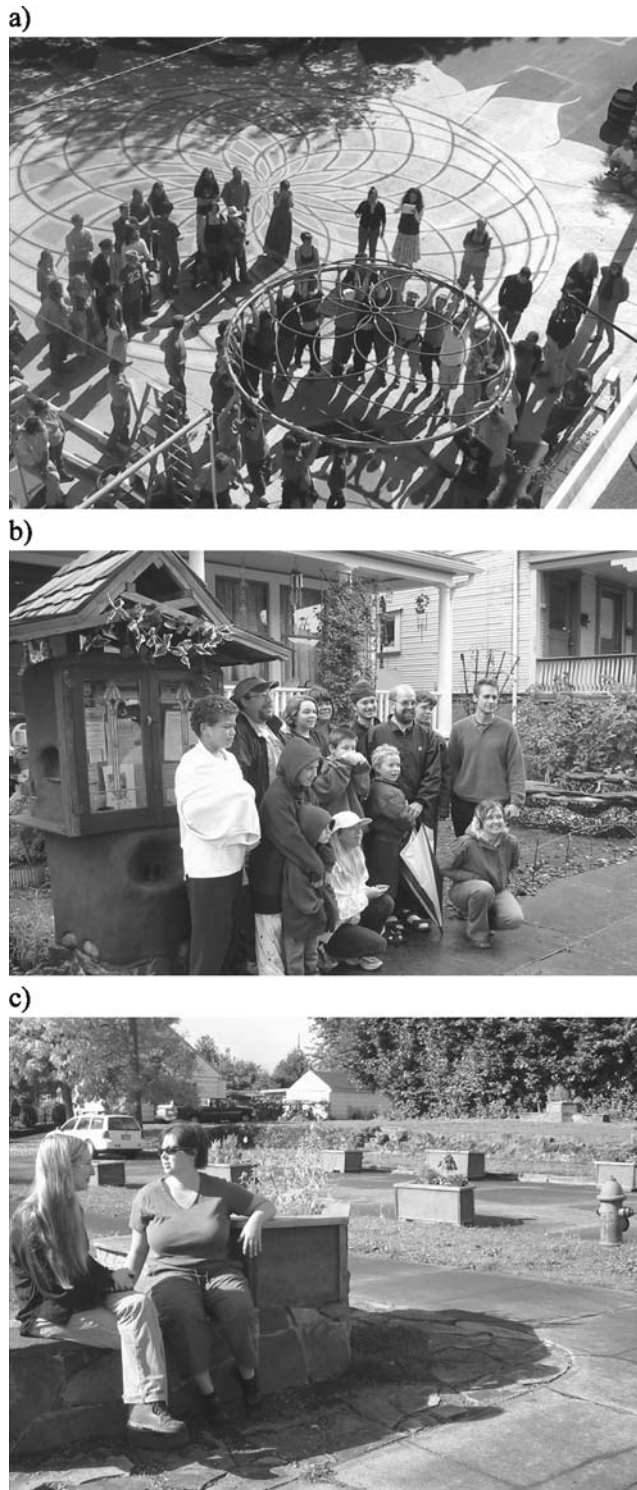


FIGURE 2. Community art projects in Portland, OR, 2003. a) Site 1: dome-raising ceremony with sunflower street mural; b) site 2: neighborhood information kiosk made of cob and mosaic benches; c) site 3: cob planter boxes and park benches in the public right of way.

households at Site 2, 170 (58%) were enrolled, 11 (4%) declined both interviews, and the remaining were vacant or not reached. At Site 3, there were 134 households within the sampling frame, of which, 85 households (63%) participated and 14 (11%) declined.

Of 674 interviews, 325 were conducted during the first round of surveys, and 349 during the second. Of the 409 study participants interviewed, 265 (65%) completed both surveys. There were more women respondents (55%) than men. The majority (83%) was under 50 years of age, and 58% were renters. To minimize the drop-out rate, no income data was collected. After project completion (time 2), 56% of respondents were aware of the Village Building Convergence workshop, although 66% had never actively participated in the construction of the art projects. Those that completed one round of surveys but not the other were similar in terms of age, sex, and house ownership (age $p=0.87$; sex $p=0.6$; ownership $p=0.28$) to those who completed both rounds of the survey. The percentage of homeowners in the study population was similar to the distribution of homeowners in each neighborhood overall ($p=0.025$ in all three neighborhood samples).

MULTIVARIATE ANALYSIS

The multivariate analyses are presented in Table 2. The estimated marginal mean change between the first and the second survey was most pronounced for sense of community scale ($p<0.01$). For example, follow-up ANOVA calculations on an item-by-item basis revealed that, within the sense of community section, two questions that probed respondents' opinions as to whether their neighborhood was a good place to live and a good place for children to grow up yielded considerable differences. Already at the onset of the study, the sense of community means ranked high, indicating a well-developed sense of place. In contrast, social interaction ranked much lower, but displayed a consistent increase at all three sites, although the change was not statistically significant ($p=0.06$). For social interaction, two questions that probed whether study participants had talked to neighbors about personal problems or asked their neighbors over to their houses to socialize displayed statistically significant differences ($p<0.05$). Social capital displayed a statistically significant increase after the intervention ($p=0.04$). At all three sites, there was a consistent decline between the first and the second survey in the estimated marginal mean for the depression scale ($p=0.03$). This change was driven by three mental health questions that showed significant differences between the two time periods: respondents' perception of their happiness, sadness, and the effort required doing everything.

TABLE 2. Multivariate results of change in social indicators and mental health between Time 1 and Time 2; health-promoting neighborhood intervention, Portland, OR, 2003

	<i>N</i>	Hoetelling's Trace	<i>F</i>	<i>p</i> value
Sense of community	260	0.09	3.97	<0.01
Social interaction	261	0.04	2.29	0.06
Perceived neighborhood control	262	0.02	0.84	0.52
Neighborhood participation	241	0.01	0.34	0.85
Social capital	229	0.15	1.71	0.04
Depression	250	0.09	1.95	0.03

DISCUSSION

Through the successive steps of community outreach, public discussions, design workshops, construction plan permitting, and project implementation, the ecological intervention aimed at improving community health by promoting community capacity. Community members conceived, designed, permitted, and constructed all three projects, without the support (financial or otherwise) of government agencies. Evaluation of the intervention suggests that mental health and a number of social indicators increased in the course of improving the neighborhood.

Prior research has shown that environmental features that facilitate social contacts and support can improve mental health.²⁴ More recently, an experimental study that randomized individuals to different living environments found neighborhood effects on mental health in both adults and children.²⁵ A direct link between the environment and mental health has been established in a variety of urban settings.^{26,27} Participation in informal activities has been associated with beneficial health outcomes.^{28–31} However, recent reports have questioned the health implications of social capital in neighborhood life.^{32–34}

The ecological intervention was aimed at creating a sense of place by reversing urban blight with artistic features in the public right-of-way. Physical deterioration, such as damaged homes, trash accumulation, abandoned vehicles, and graffiti, can adversely influence the health of a neighborhood's residents over and above personal risk factors.^{35–38} Social disorder, such as crime, public drinking, and drug use, can also negatively affect well-being and neighborhood satisfaction.^{39,40} Positive contributions such as those made during this intervention, on the other hand, contribute significantly to improved community well-being.

The revitalization illustrates the benefits of strong community involvement in urban design, a field that has traditionally been dominated by planners, architects, and developers. The projects connected individuals in the dynamic experience of planning and implementing creative and attractive gathering places, and serve as examples of how communities can intentionally design vibrant places that are restorative to their own well-being. In particular, working together on ecological construction, particularly working with cob, the natural building material, was ideal for collective physical labor, while other activities, such as community organizing and design workshops, also contributed to expanding social ties and mental health.

The intervention stimulated both bonding and bridging/linking social capital; however, since strong social ties might not necessarily translate into collective resources for social action, the concept of connecting was extended to public institutions. For example, community groups were put in touch with neighborhood associations and municipal government offices, and collaborated with structural and traffic engineers on the permitting process of construction in the public realm. Community members attended meetings with city officials for the permitting of their construction plans. Such activities were indications of bridging/linking social capital.

STRENGTHS AND LIMITATIONS

The strength of the study lay in the ecological intervention per se. The grid has been configured for cars, with little regard for the needs of pedestrians, such as walkable streets, human-scaled blocks, and usable public places.⁴³ Moreover, many existing

public places and civic amenities have decayed, resulting in loss of community and sense of place. The intervention illustrates how civic engagement can be achieved through community-building, in which resident and non-resident stakeholders participate in urban design, which is particularly important, since, in its current state, the discipline of urban planning seems to have lost the focus of creating simple, community-supporting urban environments.

This quasi-experimental design could potentially be limited by a main effect of “history, maturation, or selection.”⁴¹ “History” pertains to external forces (other than the intervention), such as economic or seasonal variation, impacting the experimental setting immediately after the pre-survey. In the absence of a non-intervention control group these possibilities were minimized by collecting data over a relatively short time period; reducing the time interval between pairs of interviews; and initiating the follow-up interview immediately after completion of the projects. The benefits of these strategies were evaluated by plotting all depression measures by interview date; no gradual improvement over time was observed, suggesting that seasonal variation or other events did not contribute to the improvement in mental health. Records were kept of possible effect-causing events throughout the study period and plotted against time; for example the perceived outcome of the Iraq war in spring 2003 did not seem to influence the dependent variables.

“Maturation” of study participants, such as personal changes among respondents (possibly due to the interview process itself), could have affected the internal validity of the study. Thus, interviewers adhered strictly to surveying techniques in order not to influence subjects’ responses; for example, study participants were blinded to the purpose of the study, and no reference was made to the upcoming workshop or intervention projects. Furthermore, the study was affiliated with the university (PSU) rather than with The City Repair Project to disassociate the survey from the actual intervention.

Since panel members were queried repeatedly, the successive surveys could have resulted in participant fatigue. In order to minimize attrition, the survey length was kept to a minimum and redundant demographic variables were omitted from the post-intervention survey; respondents were also given the possibility to return the surveys by mail or to be interviewed over the phone for convenience. These strategies and concerted field efforts counteracted the threat of selection bias as reflected by relatively high participation rates.

Another type of selection bias can be major limitation of neighborhood research, so the study was designed to circumvent this possible source of variation; selection biases can also arise when different neighborhoods are compared that may have diverse demographic compositions, whether measurable or not. Inferences about ecological effects (the context) of the neighborhood cannot be made without reference to the composition. The study measured the same respondents repeatedly (serving as their own controls), while the physical environment (context) was altered, thus controlling for the composition.^{42,43} Nevertheless, socially inclined individuals may have biased the results away from the null by being more likely to participate.

CONCLUSION

While experts recognize that voluntary involvement in organizations and institutions is crucial for problem-solving, designing programs that achieve such involvement has proven challenging. The current approach addresses some of these

challenges by building social interaction, social capital, and neighborhood capacity, while empowering neighbors to design and create the development of public places within their own neighborhood.⁴⁴ This ecological intervention also demonstrated the benefits of participation in neighborhood projects on health and social capital of residents themselves. Ultimately, the research supports the notion that dynamic collaboration between urban planners, public health practitioners, residents, developers, and politicians creates more human, more beautiful, and therefore more livable and healthy, urban places.

HUMAN PARTICIPANT PROTECTION

The institutional review board of Portland State University approved the protocol for this study. Written informed consent that briefly described the study with all the procedures and activities was obtained from study participants prior to the completion of the survey.

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REFERENCES

1. *Hippocrates Medical Corpus: Airs, Water, Places 500 b.c.* In: Lloyd GER, ed. *Hippocratic Writings*. Harmondsworth, England: Penguin; 1978.
2. Syme SL. Rethinking disease: where do we go from here? *Ann Epidemiol.* 1996; 6(5):463–468.
3. Buzbee WW. Urban form, health and the law's limits. *Am J Public Health.* 2003; 93(9):1395–1398.
4. Jackson RJ. The impact of the built environment on health: an emerging field. *Am J Public Health.* 2003;93(9):1382–1383.
5. Semenza JC. Building healthy cities: a focus on interventions. In: Vlahov D, Sandro G, eds. *Handbook of Urban Health: Populations, Methods and Practice*. New York, New York: Springer Science and Business Media; 2005:459–478.
6. Calthorp P, Fulton W. *The Regional City: Planning for the End of Sprawl*. Washington District of Columbia: Island Press; 2001:39.
7. Putnam R. Bowling alone: america's declining social capital. *J Democr.* 1995;6:65–78.
8. Bourdieu P. The forms of capital. In: Richardson J, ed. *Handbook of Theory and Research for the Sociology of Education*. New York, New York: Macmillan; 1986.

9. Coleman, J. Social capital in the creation of human capital. *Am J of Sociol.* 1988; 94(Suppl):S95–S120.
10. Granovetter M. The strength of weak ties. *Am J Sociol.* 1973;78:1360–1380.
11. Szreter S. The state of social capital: bringing back in power, politics and history. *Theory Soc.* 2002;31:573–621.
12. Altschuler A, Somkin CP, Adler NE. Local services and amenities, neighborhood social capital, and health. *Soc Sci Med.* 2004;59(6):1219–29.
13. Semenza JC. The intersection of urban planning, art, and public health: the Sunnyside Piazza. *Am J Public Health.* 2003;93(9):1439–1441.
14. Eng E, Parker E. Measuring community competence in the Mississippi Delta: the interface between program evaluation and empowerment. *Health Educ Q.* 1994; 21(2):199–220.
15. Israel BA, Checkoway B, Schulz A, Zimmerman M. Health education and community empowerment: conceptualizing and measuring perceptions of individual, organizational, and community control. *Health Educ Q.* 1994;21(2):149–170.
16. Wallerstein N. Powerlessness, empowerment, and health: implications for health promotion programs. *Am J Health Promot.* 1992;6(3):197–205.
17. Green LW, Kreuter MW. Applications in Communities. In: *Health Program Planning. An Educational and Ecological Approach* (4th ed.). New York, New York: McGraw-Hill; 2005:255–316.
18. Robertson A, Minkler M. New health promotion movement: a critical examination. *Health Educ Q.* 1994;21(3):295–312.
19. McKnight JL, Kretzmann JP. Mapping Community Capacity. In: M. Minkler ed. *Community Organizing and Community Building for Health.* New Brunswick, New Jersey: Rutgers University Press; 2005:158–172.
20. Israel B, Schulz A, Parker E, Becker A. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health.* 1998; 19:173–202.
21. Radloff LS. The CESD: a self-report depression scale for research on the general population. *Appl Psychol Meas.* 1977;1:385–401.
22. Ware JE, Snow KK, Kosinski M. *SF-36 Health Survey: Manual and Interpretation Guide.* Boston, Massachusetts: New England Medical Center; 1993.
23. Krishna A, Shrader E. *Social capital assessment tool.* Conference on Social Capital and Poverty Reduction, The World Bank, Washington DC; 1999.
24. Dalgard OS, Tambs K. Urban environment and mental health. A longitudinal study. *Br J Psychiatry.* 1997;171:530–536.
25. Leventhal T, Brooks-Gunn J. Moving to opportunity: an experimental study of neighborhood effects on mental health. *Am J Public Health.* 2003;93(9):1576–1582.
26. Stiffman AR, Hadley-Ives E, Elze D, Johnson S, Dore P. Impact of environment on adolescent mental health and behavior: structural equation modeling. *Am J Orthopsychiatr.* 1999;69(1):73–86.
27. Black MM, Krishnakumar A. Children in low-income, urban settings. Interventions to promote mental health and well-being. *Am Psychol.* 1998;53(6):635–646.
28. Buka SL, Brennan RT, Rich-Edwards JW, Raudenbush SW, Earls F. Neighborhood support and the birth weight of urban infants. *Am J Epidemiol.* 2003;157(1):1–8.
29. Johnell K, Merlo J, Lynch J, Blennow G. Neighbourhood social participation and women's use of anxiolytic-hypnotic drugs: a multilevel analysis. *J Epidemiol Community Health.* 2004;58(1):59–64.
30. Berkman LF, Glass T, Brissette I, Seeman TE. From social integration to health: Durkheim in the new millennium. *Soc Sci Med.* 2000;51(6):843–857.
31. Kawachi I, Berkman LF. Social ties and mental health. *J Urban Health.* 2001;78(3):458–467.
32. Ziersch AM, Baum FE, Macdougall C, Putland C. Neighbourhood life and social capital: the implications for health. *Soc Sci Med.* 2005;60(1):71–86.

33. Veenstra G. Location, location, location: contextual and compositional health effects of social capital in British Columbia, Canada. *Soc Sci Med.* 2005;60(9):2059–2071.
34. Veenstra G, Luginaah I, Wakefield S, Birch S, Eyles J, Elliott S. Who you know, where you live: social capital, neighbourhood and health. *Soc Sci Med.* 2005;60(12):2799–2818.
35. Aneshensel CS, Sucoff CA. The neighborhood context of adolescent mental health. *J Health Soc Behav.* 1996;37(4):293–310.
36. Latkin CA, Curry AD. Stressful neighborhoods and depression: a prospective study of the impact of neighborhood disorder. *J Health Soc Behav.* 2003;4(1):34–44.
37. Balfour JL, Kaplan GA. Neighborhood environment and loss of physical function in older adults: evidence from the Alameda County Study. *Am J Epidemiol.* 2002;155(6):507–515.
38. Kingsley GT. Housing, health, and the neighborhood context. *Am J Prev Med.* 2003; 24(3 Suppl):6–7.
39. Sampson RJ, Morenoff J, Earls F. Beyond social capital: spatial dynamics of collective efficacy for children. *Am Sociol Rev.* 1999;64:633–660.
40. Wallace R. Urban desertification, public health and public order: ‘planned shrinkage’, violent death, substance abuse and AIDS in the Bronx. *Soc Sci Med.* 1990;31(7):801–813.
41. Cook TD, Campbell DT. *Quasi-experimentation: Design & Analysis Issues for Field Settings.* Boston, MA: Houghton-Mifflin, Co.; 1979:207–233.
42. Macintyre S, Ellaway A. Neighborhoods and health: an Overview. In: Kawachi I, Berkman LF, eds. *Neighborhood and Health.* New York, New York: Oxford University Press; 2003:20–42.
43. Larsen K, Merlo J. Appropriate assessment of neighborhood effects on individual health: integrating random and fixed effects in multilevel logistic regression. *Am J Epidemiol.* 2005;161:81–88.
44. Semenza JC, Krishnasamy PV. Design of a health-promoting neighborhood intervention. *Health Promotion Practice.* Prepublished; <http://dx.doi.org/10.1177/1524839906289585>.